UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

Enterprise Energy Efficiency (3E) Project

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Task Order # 12

SREBRENICA STREET LIGHTING

PILOT PROJECT PROPOSAL No. B4-4

Author: Zoran Morvaj, Chief of Party

April 18, 2012

Implemented by:
Advanced Engineering Associates International, Inc. (AEAI)

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Enterprise Energy Efficiency - 3E

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SREBRENICA STREET LIGHTING

SITE VISIT REPORT AND PILOT PROJECT PROPOSAL EVALUATION

Zoran Morvaj
Chief of Party

Sarajevo, April 18, 2012

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1. Pilot Project Proposal Screening Report

I Partners:
The Srebrenica Municipality

II Proposed EE measures after USAID 3E analysis:	
1. Changing of street light fixtures	$70,000
Total cost of proposed EE measures	**$70,000**

III Co-funding contributions:	
1. Direct co-funding from partner's own funds;	
Srebrenica Municipality	$21,000
2. Partner co-financing from borrowed funds;	0
3. Other donors` co-funding:	0
4. Provision of works and services (e.g., decommissioning of old equipment, installation of new equipment, design and supervision services, monitoring and verification (M&V));	0
5. Provision of materials and equipment (e.g., piping, wiring, insulation material, control equipment); and	0
6. Partnership with a private sector partner that might contribute any of above.	0
Total confirmed co-funding by partner/donors:	**$21,000**

IV Co-funding by USAID 3E:	
Total 3E Project co-funding based on best estimate:	**$49,000**

V Compliance with criteria for selection:		
1. Replicability potential and relative ease of implementation;	0 - 12	12
2. Readiness and ability to put in place clear M&V procedures for reporting on post-implementation energy savings;	0 - 12	12
3. Appropriate geographic location, building type and types of technologies so that the total portfolio of 10 pilot projects when implemented demonstrates various EE measures, technologies and practices applied to different building types or EE practices and are located across the country;	0 - 24	24
4. Amount of co-financing for the pilot project that the partner is willing to or able to secure, or the amount of assistance the pilot project can obtain from other donors or private sector;	0 - 24	18
5. For the public sector - willingness to introduce energy management practices into other public buildings that are responsibility of the partner;	0 - 12	10
6. For municipalities - readiness to sign the EU Covenant of Mayors on EE;	0 - 4	4
7. For all – a willingness to support the raising of EE awareness of building users and citizens at large.	0 - 12	12
Total:	**100%**	**92%**

VI Environmental Compliance:	
Confirm that the pilot project implementation does not cause any environmental concerns or adverse environmental effects.	Yes

2. Project evaluation summary

2.1 Basic data about the project:

- Project is to reduce electric energy consumption of the street lighting in Srebrenica
- Number of lights = 40 (35 lights – 400W, 5 lights – 250W)
- Total installed capacity = 15,250W
- Average operating hours per day = 11 h
- Number of operating hours per year = 11 × 365 = 4015h
- Total electric energy consumption per year = 61 MWh
- Electrical energy cost = 0.1508 KM/kWh (0.116 $/kWh)
- Total electrical energy cost per year = 9,200 KM ($7,000)

2.2 Recommended measure:

1. Replacement of existing street lighting with LED street lights.

2.3 Rationale:

1. Mercury vapor lamps, which are a majority of the installed lights, are an obsolete technology for street lighting, and they are not energy efficient.
2. These measures can be replicated across Bosnia and Herzegovina, since most of the street lighting systems across the country are outdated.

2.4 Benefits:

- Large energy savings.
- Better road visibility.
- Stimulation of local economy; local firms will be hired to do the works.
- Increased awareness of the local government.
- Practical demonstration of benefits of new energy efficient lighting technologies.
- Demonstration of energy savings through LED lighting technology.
- Increase of public awareness of benefits of energy efficiency measures and that energy costs should not be regarded as a fixed cost.
- Motivation of local governments to financially support such projects.
- Reduction of CO2 emissions.
- Improvement of public health.

3. Project Technical Description and Analysis

3.1 Introduction

The Srebrenica Municipality is interested in reducing energy consumption. In achieving the targeted reduction in overall energy consumption, reduction in street lighting consumption plays an important role. Representatives of the Srebrenica Municipality contacted 3E and proposed the public street lighting as a 3E pilot project, followed by the receipt of an official proposal signed by the Municipality Mayor.

The proposed pilot project represents improvement of the energy efficiency of the public lighting in the downtown area. The proposal is to replace existing lamps (Figure 1) with Light Emitting Diode (LED) lamps. Through this project 3E can demonstrate energy efficiency measures for public lighting for towns that use old and/or obsolete technology.

The 3E team visited Srebrenica, performed a walk-through audit and collected relevant information:

3.2 Site visit report

Legal regulations provide that general utility consumption is under the jurisdiction of the municipal administration. Municipal utility consumption includes the costs of electricity and maintenance of the public light system, cost of water in public fountains and hydrants and the maintenance cost of public green area and parks.
Costs of the public light system maintenance and electricity for the public light system have significantly increased in recent years.

Figure 1. – Street lights in Srebrenica

3.3 Technical and financial analysis

The main problem of the public lighting system in the Srebrenica municipality is the high cost of the high consumption and inefficient technology currently used in the public lighting system in the Srebrenica Municipality. The majority of the lights are mercury light bulbs with a few halogen and sodium bulbs. Because of these inefficient technologies, 95% electricity in the public lighting system is lost in the form of heat energy. The only way to decrease the mentioned costs is to increase the efficiency of the lights used in the public light system by changing the technology used. Another problem with the technology currently used is the frequent burn-out of the light bulbs due to their technical characteristics and age.

The estimated before and after measures electricity consumption and cost per year is shown in table 1. The large energy saving of more than 65% is because the LED street light technology is much more efficient and also because the existing system was oversized.

Table 1. Electrical energy consumption

Energy carrier	Unit	Present	After measures	Savings
Electricity	MWh	61	21	40
	$	7,000	2,400	4,600

The reduction of CO2 emissions achieved by implementation of the measures will be approximately 12 tons per year.

The cost for the measures and the payback period is shown in table 2. It is assumed that the price per kWh remains the same. Apart from the large energy savings, a significant saving in maintenance costs is also important. The LED street lights have up to 5 times longer lifetime and do not suffer from significant lumen depreciation, while mercury vapor lights produce approximately 50% less light every five years used. The rated lifetime of LED lights is 50,000h (more than 12 years), while mercury vapor lights are rated at 10,000h. Based on this, a savings of approximately $9,000 in maintenance costs will be achieved for the 40 lights evaluated. In the course of the LED light's lifetime of 12 years, approximately $750 will be saved in maintenance costs per year.

Table 2. Preliminary cost and benefit analysis for recommended measures

Measures	Investment [$]	Annual Energy and Maintenance Savings Est [$]	Simple payback period [year]
Changing of street light modules	70,000	5,350	13

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LETTER FROM THE MAYOR OF THE SREBRENICA MUNICIPALITY